Space Weather Forecast

Issued on Thursday, 15 August 2024 at 13:30 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

Space Weather Forecast Headline: Moderate class flares expected, a chance of Strong class flares. G1-G2 Minor to Moderate storms on day 3 (17 Aug) due to coronal mass ejection arrival.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Moderate with three Moderate class flares, the strongest from a sunspot region just over the eastern limb that is just about becoming visible. There are ten regions on the visible disc, with the most notable being a moderately sized and compact region in the north-centre disc, with a complex magnetic structure. This includes mixed polarity areas within the same spot, and a non-typical alignment of its magnetic field. The area of the spot has increased, especially in the stronger, darker field areas within the mixed polarity region, along with some small surrounding spots emerging. Elsewhere, the large sunspot in the southeast persists, but with some apparent weakening, although this could be due to the increasing viewing angle.

No Earth-directed CMEs (coronal mass ejections) were observed leaving the Sun in this period.

Solar Wind / Geomagnetic Activity: Mainly slow wind conditions were observed, although some increased magnetic strength perhaps hinted at some transient influence. Solar wind speeds eased from slightly elevated to background, from 400 km/s to below 350km/s. The Interplanetary Magnetic Field ranged from Weak to Moderate with the main strength between 14/2030-15/0630 UTC. The north-south component peaked weakly southward (negative) at around 14/2030 UTC before rotating to be persistent northward (positive) thereafter. Geomagnetic activity was mostly Quiet, but Unsettled 14/2100-15/0000 UTC (Kp 0-3).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) was at background with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate to High solar activity is forecast, with Moderate-class flares expected and a chance of an isolated Strong-class flare. There is slight chance of activity becoming Very High due the risk from the complex sunspot in the north-centre disc.

Solar Wind /Geomagnetic Activity: A faint, partial halo CME occurred due to the strong-flare at 14/0640UTC (X1.1), and is forecast to arrive at Earth day 3 (17 Aug). However, the strength of any impact is low confidence. This has the potential to be further enhanced by the arrival of coronal hole sourced fast winds, however these are most likely to remain north of Earth. Mainly Quiet geomagnetic activity at first is expected to become Active to G1/G2 Minor to Moderate Storm on day 3 (17 Aug) due to any CME arrival, with a slight chance of reaching G3 Strong Storm. Activity then easing day 4 (18 Aug).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is most likely to remain at background to with no solar radiation storms observed. However there is a chance of this count rate rising towards the S1 Minor Radiation Storm level, and potentially to high levels, given the occurrence of any notable flares.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	10	70	40
Strong	G3	No	1	1	15	5
Severe	G4	No	1	1	2	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	80	75	75	75
Very Active	R3 to R5 X	No	40	40	30	20

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	25	30	30	30
Very Active	≥ S3 *	No	5	5	5	5

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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